

ART. XIX. A NEW SALAMANDER, *PLETHODON NETTINGI*,  
FROM WEST VIRGINIA.

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During the period from June 22 to July 2, 1935, the members of the Oglebay Park Nature Training School of Wheeling, camped at White Top Mountain near Cheat Bridge, Randolph County, West Virginia, to study the natural history of that region. While encamped at this spot a trip was taken to Barton Knob a few miles away, and among the salamanders collected by Messrs. M. Graham Netting and Leonard Llewellyn was a single specimen of a salamander which seemed quite distinct from any described species. Netting (1937: 92) in his discussion of this collection, lists this as "*Plethodon* sp.?" No additional specimens were collected at this time but extensive collecting in this section during the summer of 1936 increased the collection to eleven specimens.

The author desires to thank Mr. Neil D. Richmond for a critical examination of this manuscript and for permission to quote from his field notes.

I take pleasure in naming this species for M. Graham Netting in recognition of his valuable contributions to West Virginian herpetology, not only directly through his own researches but also indirectly through his constant and unselfish encouragement and inspiration to other workers.

***Plethodon nettingi* sp. nov.**

*Diagnosis:* A small *Plethodon* with an elongate body; costal grooves 18-19, usually 18; vomerine teeth 4-8 in row extending to outer edge of nares; belly uniformly dark with throat lighter than belly; back with many fine gold flecks extending to base of tail, not evident in preserved specimens.

*Range:* Known only from Cheat Bridge and Barton Knob, Randolph County, West Virginia.

*Description of holotype:* Carnegie Museum no. 10279; adult male collected above 4,000 feet on Barton Knob, near Cheat Bridge, West



Virginia, on June 29, 1935, by M. Graham Netting; 18 costal grooves; 4 costal folds between appressed toes; head width 7.5 in length from snout to vent; head length 4.7 in length from snout to vent; eye slightly longer than distance from its anterior angle to nostril; snout swollen; a small tubercle at lower end of naso-labial groove; outline of upper jaw concave as seen from side; angle of jaw back of hind angle of eye; both eyelids fitting under a fold of skin behind; a groove from eye to gular fold, a groove from this down behind angle of jaw; limbs weak; fingers 3, 2, 4, 1, in order of length, slightly webbed at base, first finger very short, entirely in web; toes 3, 4, 2, 5, 1, in order of length, webbed at base; vent papillate; tail slightly longer than body, terete; vomerine teeth 4-6 in series beginning behind outer edge of nares; the two rows separated in midline by a distance equal to .5 width of naris and from the parasphenoids by a distance of 1.5 width of naris; parasphenoids in two patches, faintly separated, beginning at middle of eyesockets; black above; belly uniformly dark slaty gray, throat grayish mottled with white; total length 81 mm., length of head 9.5, width of head 6, body 35.5, tail 36.

*Description of allotype:* Carnegie Museum no. 11900; adult female collected in the same locality on August 4, 1936, by Maurice Brooks; differs in having snout not swollen; no tubercle at lower end of naso-labial groove; lining of vent folded, not papillate; vomerine teeth 7-7 in series, separated from parasphenoids by a distance equal to twice width of naris; total length 80 mm., length of head 9, width of head 5.5, body 34, tail 37.

In the smallest specimen examined (NBG 245), measuring 28 mm. from snout to vent, the toes of the appressed limbs are separated by two costal folds.

In ten of the eleven specimens examined there are 18 well-defined costal grooves. The eleventh specimen has 19. Five of the specimens have a groove over the hind leg. The practice followed in counting costal grooves has been to count the one over the front leg as the first and to continue to the hind leg, counting both forks of the last groove. In counting costal folds between appressed toes, only entire folds were counted.

The number of vomerine teeth in a row varies from four to eight, with six occurring most frequently. In two specimens the two patches of parasphenoids are faintly separated, in the others they form a single patch. Two specimens have a sparsely spotted belly somewhat reminiscent of *Plethodon richmondi*. None of the specimens have any white on their sides; the amount of white on the throat varies from a light gray to almost white.

*Material:* Holotype, CM 10279, from Barton Knob, Randolph County, West Virginia, collected by M. Graham Netting; allotype, CM 11900, from same locality, collected by Maurice Brooks. Paratypes, CM 11901, from Barton Knob, collected by Maurice Brooks;

CM 11809-11814, from Cheat Bridge, collected by Neil D. Richmond; NBG 245 and 323 from Barton Knob, collected by the author.

*Eggs:* A nest of eight eggs was exposed by Neil Richmond while opening a decayed hemlock log near Cheat Bridge, on July 15, 1936. The eggs were scattered in tearing the log open so that it was not possible to determine how they were attached. One egg had a small pedicel attached to it which had probably served to attach the eggs to the nest. Two adults were taken with the eggs but their sex was not determined at the time of capture and as they were put with the others of the series their identity was lost. Each egg is 4 mm. in diameter and contains a well-developed embryo. The eggs are deposited in the Carnegie Museum, CM 11808.

*Remarks:* The places, where the specimens were collected, are in the southern part of Randolph County, one of the east-central counties of West Virginia. These localities are about twelve miles from the Virginia State Line which follows the crest of the Alleghenies. Barton Knob is one of the peaks in the Cheat Mountain range, with an elevation of 4433 feet, while at Cheat Bridge, three miles away, the elevation is 3557 feet. The region in and around Cheat Bridge is the region of heaviest precipitation in the state, averaging more than sixty inches a year. The area was originally covered with spruce forest which is now almost entirely restricted to the higher peaks, with *Tsuga canadensis*, *Betula lutea*, and *Rhododendron maximum* replacing it on the lower slopes and in the ravines. Many of these cool shady ravines abound and it was in this type of habitat that most of the specimens were taken.

The species associated with *Plethodon nettingi* on Barton Knob were *Plethodon cinereus*, *Plethodon wehrlei*, and *Desmognathus fuscus ochrophaeus*. *Plethodon wehrlei* is common, more than 100 specimens having been collected and many others observed at this place. Netting (1937: 89-93) discusses the occurrence of *P. wehrlei* on Barton Knob and gives a description of its habitat. *P. cinereus* is even more abundant than the larger *wehrlei*. Of the hundreds of specimens that have been collected at this locality all were of the typical red-backed phase. *Desmognathus f. ochrophaeus* is common throughout the area and may be taken in almost any conceivable habitat. Noble (1931: 90-91) discusses the variation in color among specimens of this salamander taken at Durbin, which is five miles distant from Cheat Bridge.

The new form, *Plethodon nettingi*, seems to prefer cool shady ravines

where it occurs in moist decayed logs and under rocks, especially where one rock is found resting on another. Quoting from Neil Richmond's field notes on the series of eight collected at Cheat Bridge (of which two living specimens were lost during transit to Pittsburgh): "two specimens were taken together, beneath a stone on top of a large boulder; the others were found in the same type of places except three which were taken in logs. Two of these were in one log with an egg mass." The author collected one specimen on the slope of Barton Knob in a decayed Yellow Birch log. The specimen was very active and behaved much like *cinereus* in attempting to escape. Of the eleven specimens in the collection, seven have some or all of their tails missing. In only one of these is the tail regenerating; the other six had their tails broken during collecting. This salamander is active and attempts to escape when disturbed.

*Plethodon nettingi* seems to be most closely related to *Plethodon welleri* and *Plethodon richmondi*. It differs from *welleri* in the more elongate form, longer tail length in proportion to body length, two more costal grooves, dorsal color pattern of small flecks instead of larger bronze areas, a higher vomerine tooth count, and lighter throat. A costal groove count made on 25 topotypes of *welleri* showed an average of 16.04 while the eleven specimens of *nettingi* showed an average of 18.09. An average of the costal folds between the appressed toes in the 25 *welleri* topotypes showed an average of 2.68 while an average of the *nettingi* showed 4.5. *Plethodon nettingi* is similar to *welleri* in body size and coloration, but in *nettingi* the dorsal coloration is conspicuously black and the tiny gold flecks, although abundant in some of the specimens, are diffusely distributed and never coalesce to form the typical dorsal pattern of *welleri*. The author has collected and observed both *welleri* and *nettingi* in the field and finds no similarity in the pattern except that in both species the bronze markings are of an iridescent greenish gold suggestive of those of *Aneides aeneus*.

*Plethodon nettingi* differs from the recently described *richmondi* in being a shorter form, with the tail length shorter in proportion to the body length, fewer costal grooves, shorter vomerine series and more uniformly colored venter. It resembles *richmondi* in having a black back with fine gold flecks.

Adult males of *welleri* and *nettingi* do not have enlarged premaxillary teeth as do those of *cinereus*.

*P. nettingi* is related to *P. welleri*, in all probability, through a genetic

bridge with a common ancestor. This common ancestor may have been *richmondi*. But any discussion of the relationships of these forms must wait until we have more knowledge of their distribution, particularly in the regions where their ranges may overlap. There is a need for collections from lower altitudes around Grandfather Mountain, North Carolina, and White Top Mountain, Virginia, in both of which localities *welleri* has been taken.

## DATA ON SPECIMENS STUDIED.

Catalogue Number Carnegie Museum	Sex	DATA ON SPECIMENS STUDIED.				Vomer-		Costal
		Head Length	Head Width	Body Length	Total Length	ine Teeth	Costal Grooves	Folds between Toes
10279	male	9.5	6	35.5	81	4-6	18	4
11900	female	9	5.5	34.0	80	7-7	18	4
11901	male	8.5	6	33.5	48+	6-6	18	4
11809	male	9	6	34	78+	6-6	18	3
11810	male	8	6	34	65+	6-8	19	4
11811	female	8.5	5.5	32.5	78	6-6	18	5
11812	female	9	5.5	31	76	6-6	18	4
11813	female	7.5	5	26.5	48+	5-5	18	4
11814	female	7	5	25	33+		18	4
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245		6.5	4	21.5	41+		18	2
323	female	8	5	29	70	7-6	18	4

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